IN THE CLAIMS

For the convenience of the Examiner, all pending claims of the present Application are shown below.

1. (Currently Amended) An optical processing device, comprising:

an optical signal separator operable to direct ~~an portion~~ a portion of an unmodulated optical signal for modulation; ~~modulation; and~~

an array of variable blazed gratings located on one or more semiconductor substrates, the array of variable blazed gratings operable to receive the portion of unmodulated optical signal and to modulate that signal based at least in part on a control signal received from a ~~controller.~~ controller; and

one or more optical amplifiers capable of at least partially compensating for at least some of the losses associated with processing optical signals in the optical processing device.

2. (Currently Amended) The optical processing device of Claim 1, wherein the optical signal separator ~~comprises~~ is selected from the group consisting of a beam splitter, a fiber optic tap, a demultiplexer, and a circulator, ~~a beam splitter.~~

3. (Currently Amended) The optical processing device of Claim 1, wherein the optical signal comprises a multiple wavelength optical signal and wherein at least some of the wavelengths ~~comprises~~ comprise a different center wavelength.

4. (Currently Amended) The optical processing device of Claim 1, wherein the array of variable blazed gratings comprises:

one or more inner conductive layers; and

a plurality of approximately adjacent at least partially reflective mirrors ~~mirror strips~~ disposed outwardly from the one or more inner conductive layers, each mirror ~~strip~~ operable to receive at least some ~~a portion~~ of the ~~potion~~ portion of the unmodulated optical signal, wherein each of the plurality of mirrors ~~strips~~ is operable to undergo a partial rotation.

5. (Currently Amended) The optical processing device of Claim 4, wherein none of the mirrors ~~strips~~ has a width greater than 40 microns.

6. (Currently Amended) The optical processing device of Claim 4, wherein the mirrors ~~strips~~ are operable to undergo a maximum rotation that is greater than 2 degrees.

7. (Original) The optical processing device of Claim 1, wherein the one or more semiconductor substrates comprise silicon.

8. (Currently Amended) The optical processing device of Claim 1, wherein the controller is located on one of the one or more semiconductor substrates. ~~the semiconductor substrate.~~

9. (Original) The optical processing device of Claim 1, wherein the controller comprises an array of wavelength detectors operable to receive at least another portion of the unmodulated optical signal, the array of wavelength detectors operable to convert the another portion of the unmodulated signal into an electronic format.

10. (Original) The optical processing device of Claim 1, wherein the controller comprises an electronic processor coupled to the array of variable blazed gratings and operable to perform an electronic processing operation on at least another portion of the unmodulated optical signal.

11. (Currently Amended) An optical processing device, comprising:

an optical signal separator operable to direct a portion of an unmodulated optical signal for modulation;

an array of variable blazed gratings located on one or more semiconductor substrates, the array of variable blazed gratings operable to receive the portion of the unmodulated optical signal and to modulate that signal based at least in part on a control signal received from a controller; and

~~The optical processing device of Claim 1, further comprising~~ a delay line operable to receive at least another portion of the unmodulated optical signal and to delay transmission

of that signal portion until the ~~another~~ portion of the unmodulated optical signal has been processed.

12. (Cancelled)

13. (Currently Amended) The optical processing device of Claim 1, ~~Claim 12,~~ wherein the one or more optical amplifiers comprise ~~discrete~~ Raman amplifiers.

14. (Currently Amended) An optical processing device, comprising:

an array of variable blazed gratings located on one or more semiconductor substrates and operable to receive one or more optical signals from an optical signal separator, the array of variable blazed gratings operable to perform an optical signal processing operation on at least one of the one or more optical signals; ~~signals; and~~

a controller coupled to the array of variable blazed gratings, the controller operable to generate at least one control signal capable of affecting the optical signal processing performed on the at least one optical signal; and ~~signal.~~

one or more optical amplifiers capable of at least partially compensating for at least some of the losses associated with processing optical signals in the optical processing device.

15. (Currently Amended) The optical processing device of Claim 14, wherein the optical signal separator ~~comprises~~ is selected from the group consisting of a beam splitter, a fiber optic tap, a demultiplexer, and a circulator. ~~a beam splitter.~~

16. (Currently Amended) The optical processing device of Claim 14, wherein the optical signal comprises a multiple wavelength optical signal and wherein at least some of the wavelengths ~~comprises~~ comprise a different center wavelength.

17. (Currently Amended) The optical processing device of Claim 14, wherein the array of variable blazed gratings comprises:

one or more inner conductive layers; and

a plurality of approximately adjacent at least partially reflective mirrors ~~mirror strips~~ disposed outwardly from the one or more inner conductive layers, each mirror ~~strip~~ operable to receive ~~a portion of the potion of the unmodulated optical signal~~ a portion of at least one of the one or more optical signals, wherein each of the plurality of mirrors ~~strips~~ is operable to undergo a partial rotation.

18. (Original) The optical processing device of Claim 14, wherein the one or more semiconductor substrates comprise silicon.

19. (Original) The optical processing device of Claim 14, wherein the optical signal processing operation performed on the one or more optical signals is selected from the group consisting of variable attenuation, optical switching, and add/drop multiplexing.

20. (Currently Amended) The optical processing device of Claim 14, wherein the controller comprises an array of wavelength detectors operable to receive ~~at least another portion of the unmodulated optical signal~~ a portion of at least one of the one or more optical signals, the array of wavelength detectors operable to convert the ~~another~~ portion of the at least one of the one or more optical signals ~~unmodulated signal~~ into an electronic format.

21. (Currently Amended) The optical processing device of Claim 14, wherein the controller comprises an electronic processor coupled to the array of variable blazed gratings and operable to perform an electronic processing operation on ~~at least another portion of the unmodulated optical signal~~ a portion of at least one of the one or more optical signals.

22. (Currently Amended) An optical processing device, comprising:

an array of variable blazed gratings located on one or more semiconductor substrates and operable to receive one or more optical signals from an optical signal separator, the array of variable blazed gratings operable to perform an optical signal processing operation on at least one of the one or more optical signals;

a controller coupled to the array of variable blazed gratings, the controller operable to generate at least one control signal capable of affecting the optical signal processing performed on the at least one optical signal; and

~~The optical processing device of Claim 14, further comprising~~ a delay line operable to receive ~~at least another portion of the unmodulated optical signal~~ a portion of at least one of the one or more optical signals and to delay transmission of that signal portion until another portion of the one or more optical signals has ~~optical signal has~~ been processed.

23. (Cancelled)

24. (Currently Amended) The optical processing device of Claim 14, ~~Claim 23,~~ wherein the one or more optical amplifiers comprise ~~discrete~~ Raman amplifiers.

25. (Currently Amended) An optical processing element operable to receive and process one or more optical signals, the optical processing element comprising:

an optical signal separator operable to direct a portion of an optical signal for processing;

an array of variable blazed gratings located on one or more semiconductor substrates, the array of variable blazed gratings operable to perform an optical signal processing operation on at least the portion of the optical signal; ~~signal; and~~

an electronic processor coupled to the array of variable blazed gratings, the electronic processor operable to perform an electronic processing operation on at least a portion of the optical signal; and ~~signal.~~

one or more optical amplifiers capable of at least partially compensating for at least some of the losses associated with processing optical signals in the optical processing device.

26. (Currently Amended) The optical processing device of Claim 25, wherein the array of variable blazed gratings comprises:

one or more inner conductive layers; and

a plurality of approximately adjacent at least partially reflective mirrors ~~mirror strips~~ disposed outwardly from the one or more inner conductive layers, each mirror ~~strip~~ operable to receive a portion of the ~~potion~~ portion of the optical signal, wherein each of the plurality of mirrors ~~strips~~ is operable to undergo a partial rotation.

27. (Original) The optical processing device of Claim 25, wherein the one or more semiconductor substrates comprise silicon.

28. (Original) The optical processing device of Claim 25, wherein the optical signal processing operation performed on the one or more optical signals is selected from the group consisting of variable attenuation, optical switching, and add/drop multiplexing.

29. (Original) The optical processing device of Claim 25, further comprising a controller operable to generate at least one control signal capable of affecting the optical signal processing operation performed on the optical signal.

30. (Original) The optical processing device of Claim 29, wherein the controller comprises an array of wavelength detectors operable to receive at least another portion of the optical signal, the array of wavelength detectors operable to convert the another portion of the unmodulated signal into an electronic format.

31. (Currently Amended) An optical processing element operable to receive and process one or more optical signals, the optical processing element comprising:

an optical signal separator operable to direct a portion of an optical signal for processing;

an array of variable blazed gratings located on one or more semiconductor substrates, the array of variable blazed gratings operable to perform an optical signal processing operation on at least the portion of the optical signal;

an electronic processor coupled to the array of variable blazed gratings, the electronic processor operable to perform an electronic processing operation on at least a portion of the optical signal; and

~~The optical processing device of Claim 25, further comprising~~ a delay line operable to receive at least another portion of the optical signal and to delay transmission of that signal portion until the ~~another~~ portion of the optical signal has been processed.

32. (Currently Amended) An optical processing device, comprising:

a separator operable to separate an input optical signal into one or more optical signal wavelengths; and

~~a linear array~~ an array of variable blazed gratings located on one or more semiconductor substrates, each of the variable blazed gratings operable to perform an optical signal processing operation on at least one optical signal wavelength, the optical signal processing operation based at least in part on a control signal received from a controller, wherein the separator is located on at least one of the one or more semiconductor substrates.

33. (Original) The optical processing device of Claim 32, wherein the optical processing device performs a function selected from the group consisting of variable attenuation, an optical add/drop multiplexing, and an optical routing.

34. (Currently Amended) The optical processing device of Claim 32, wherein the array comprises a linear array. ~~separator is located on the semiconductor substrate.~~

35. (Currently Amended) The optical processing device of Claim 32, wherein at least one of the variable blazed gratings comprises:

an inner conductive layer; and

a plurality of approximately adjacent at least partially reflective mirrors ~~mirror strips~~ disposed outwardly from the inner conductive layer, each mirror ~~strip~~ operable to receive at least a portion of the input optical signal, wherein each of the plurality of mirrors ~~strips~~ is operable to undergo a partial rotation.

36. (Currently Amended) The optical processing device of Claim 35, wherein none of the mirrors ~~strips~~ has a width greater than 40 microns.

37. (Currently Amended) The optical processing device of Claim 35, wherein the mirrors ~~strips~~ are operable to undergo a maximum rotation that is greater than 2 degrees.

38. (Original) The optical processing device of Claim 32, wherein the one or more semiconductor substrates comprise silicon.

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Cancelled)

43. (New) A light processing system, comprising:

an optical signal separator operable to direct a portion of an unmodulated optical signal for modulation; and

an array of optical signal processing devices located on one or more semiconductor substrates, the array of optical signal processing devices operable to receive the portion of unmodulated optical signal and to modulate that signal based at least in part on a control signal received from a controller;

wherein at least some of the optical signal processing devices comprise:

an inner conductive layer comprising an at least substantially conductive material and a plurality of electrically coupled first conductors; and

a plurality of at least partially reflective mirrors disposed outwardly from the inner conductive layer and operable to receive at least a portion of the unmodulated optical signal, wherein none of the plurality of mirrors has a width greater than 40 microns and wherein at least some of the mirrors are operable to undergo a partial rotation in response to the control signal, the partial rotation resulting in a reflection of the unmodulated optical signal wherein a majority of the reflected optical signal is communicated in one direction;

wherein each of the plurality of electrically coupled first conductors is associated with a separate one of at least some of the plurality of at least partially reflective mirrors and disposed approximately inwardly from a first edge of the associated mirror; and

wherein the control signal comprises a voltage operable to create one of a plurality of selectable non-zero voltage differentials between the inner conductive layer and at least the first edges of the associated mirrors to create an electrostatic force tending to rotate the first edges of the mirrors toward the associated first conductor resulting in one of a plurality of selectable angles of rotation of the mirrors.

44. (New) The light processing system of Claim 43, wherein the optical signal separator is selected from the group consisting of a beam splitter, a fiber optic tap, a demultiplexer, and a circulator.

45. (New) The light processing system of Claim 43, wherein the optical signal separator is a wavelength division demultiplexer that separates the unmodulated optical

signal into a plurality of wavelength signals, each wavelength signal carrying one or more wavelengths of light.

46. (New) The light processing system of Claim 43, wherein the unmodulated optical signal comprises a multiple wavelength optical signal and wherein at least some of the wavelengths comprise a different center wavelength.

47. (New) The light processing system of Claim 43, wherein the mirrors are operable to undergo a maximum rotation that is greater than 2 degrees.

48. (New) The light processing system of Claim 43, wherein the one or more semiconductor substrates comprise silicon.

49. (New) The light processing system of Claim 43, wherein the controller is located on the one or more semiconductor substrates.

50. (New) The light processing system of Claim 43, further comprising a light pipe that is capable of guiding the portion of the unmodulated optical signal to the array of optical signal processing devices.

51. (New) The light processing system of Claim 43, further comprising an optical reflector operable to receive at least some of the modulated optical signal and to direct the at least some of the modulated optical signal to an output.

52. (New) The light processing system of Claim 51, wherein the optical reflector is selected from the group consisting of a reflective surface, a mirror and a wavelength division multiplexer.

53. (New) The light processing system of Claim 51, wherein the optical reflector is used to change the direction of the modulated optical signal from the optical signal processing devices to the output.

54. (New) The light processing system of Claim 53, wherein an angle between a modulated optical signal beam from the optical signal processing devices to a direction of the output is less than 90 (ninety) degrees.

55. (New) The light processing system of Claim 51, wherein the optical reflector is a substantially flat mirror.

56. (New) The light processing system of 51, wherein the one direction into which a majority of the reflected optical signal is communicated is substantially coupled to the output and other rotation angles for the optical signal processing devices are not substantially coupled to the output.

57. (New) A light processing system operable to receive and process one or more optical signals, the light processing system comprising:

an optical signal separator operable to direct a portion of an optical signal for processing;

an array of optical signal processing devices located on one or more semiconductor substrates, the array of optical signal processing devices operable to perform an optical signal processing operation on at least the portion of the optical signal; and

an electronic processor coupled to the array of optical signal processing devices, the electronic processor operable to perform a processing operation on at least some of the portion of the optical signal;

wherein at least some of the optical signal processing devices comprise:

an inner conductive layer comprising an at least substantially conductive material and a plurality of electrically coupled first conductors; and

a plurality of at least partially reflective mirrors disposed outwardly from the inner conductive layer and operable to receive at least some of the portion of the optical signal, wherein none of the plurality of mirrors has a width greater than 40 microns and wherein at least some of the mirrors are operable to undergo a partial rotation in response to one or more control signals, the partial rotation resulting in a reflection of the at least some of the portion of the optical signal wherein a majority of the reflected optical signal is communicated in one direction;

wherein each of the plurality of electrically coupled first conductors is associated with a separate one of at least some of the plurality of at least partially reflective mirrors and disposed approximately inwardly from a first edge of the associated mirror; and

wherein the one or more control signals comprise a voltage operable to create one of a plurality of selectable non-zero voltage differentials between the inner conductive layer and at least the first edges of the associated mirrors to create an electrostatic force tending to rotate the first edges of the mirrors toward the associated first conductor resulting in one of a plurality of selectable angles of rotation of the mirrors.

58. (New) The light processing system of Claim 57, wherein the optical signal separator is selected from the group consisting of a beam splitter, a fiber optic tap, a demultiplexer, and a circulator.

59. (New) The light processing system of Claim 57, wherein the optical signal separator is a wavelength division demultiplexer that separates the optical signal into a plurality of wavelength signals, each wavelength signal carrying one or more wavelengths of light.

60. (New) The light processing system of Claim 57, wherein the one or more optical signals comprise a multiple wavelength optical signal and wherein at least some of the wavelengths comprise a different center wavelength.

61. (New) The light processing system of Claim 57, wherein the mirrors are operable to undergo a maximum rotation that is greater than 2 degrees.

62. (New) The light processing system of Claim 57, wherein the one or more semiconductor substrates comprise silicon.

63. (New) The light processing system of Claim 57, wherein the optical signal processing operation performed on the one or more optical signals is selected from the group consisting of variable attenuation, optical switching, and add/drop multiplexing.

64. (New) The light processing system of Claim 57, further comprising a light pipe that is capable of guiding the portion of the optical signal to the array of optical signal processing devices.

65. (New) The light processing system of Claim 57, further comprising an optical reflector operable to receive at least some of the processed optical signal and to direct the at least some of the processed optical signal to an output.

66. (New) The light processing system of Claim 65, wherein the optical reflector is selected from the group consisting of a reflective surface, a mirror and a wavelength division multiplexer.

67. (New) The light processing system of Claim 65, wherein the optical reflector is used to change the direction of the processed optical signal from the optical signal processing devices to the output.

68. (New) The light processing system of Claim 67, wherein an angle between a processed optical signal beam from the optical signal processing devices to a direction of the output is less than 90 (ninety) degrees.

69. (New) The light processing system of Claim 65, wherein the optical reflector is a substantially flat mirror.

70. (New) The light processing system of 65, wherein the one direction into which a majority of the reflected optical signal is communicated is substantially coupled to the output and other rotation angles for the optical signal processing devices are not substantially coupled to the output.